

# The Third Nuclear Age: Exploring Non-Traditional Security Challenges in Nuclear Policymaking

Insights from Experts & Diplomats

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## **International Student/Young Pugwash (ISYP)**

International Student/Young Pugwash (ISYP) is a global network of students and young professionals concerned with the nexus of science, ethics, and security. Inspired by the Pugwash Conferences on Science and World Affairs, ISYP tackles global challenges through cross-national track II dialogue. ISYP provides a forum for students and young professionals to examine and explore motivations for scientific advancements, and the corollaries of technology on everyday lives.

## **Third Nuclear Age Project (3NA)**

The Third Nuclear Age (3NA) project, led by ISYP, explores how non-traditional and systemic forces, including climate change, social justice, and public perception, are reshaping nuclear policymaking. Drawing on insights from diplomats, government officials, experts, and civil society globally, the project examines the shifts in arms control erosion, multipolarity, technological change, and Global Majority frustration intersect with often-neglected human-centered concerns. By foregrounding perspectives from non-nuclear-weapon states and marginalized communities, 3NA seeks to identify gaps in current nuclear decision-making and develop intersectional policy recommendations that align nuclear governance with long-term human security.

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## Introduction

In November 2022, International Student Young Pugwash (ISYP) invited over 20 emerging global leaders and leading experts to Berlin, Germany, for the inaugural Third Nuclear Age (3NA) Conference. Attendees were invited to present research on topics related to the “Third Nuclear Age,” encompassing the emergence of integrated deterrence in nuclear strategy and the risks associated with artificial intelligence (AI) in nuclear command and control.

The following year, ISYP launched the second phase of its 3NA project. This phase explores understudied and complex non-traditional security forces that complicate strategic positioning, such as climate change, social justice, and public perception. The project aims to fill a void in nuclear policy discourse, empower and integrate young voices into active policy discussions about nuclear weapons, and facilitate meaningful engagement and interdisciplinary community-building around existential issues.

## The Third Nuclear Age

During the Cold War, also known as the “First Nuclear Age,” the confrontation between two nuclear superpowers largely shaped nuclear policy thinking. Much of this thinking persisted after the Cold War, despite the transition from the First Nuclear Age to a “Second Nuclear Age,” which heralded new power dynamics and further nuclear proliferation in Asia.

A growing body of literature exists on the concept of a new, Third Nuclear Age. Scholars, including Michal Smetana (2018), Jenny Naylor (2019), Nicholas Miller and Vipin Narang (2019), Rebecca Hersman (2020), and Andrew Futter et al. (2021, 2025) have all observed a clear difference between our current nuclear landscape and past ones. This paradigm shift is characterized by a combination of elements, including new strategic weaponry, an increasingly multipolar landscape, expanding nuclear arsenals, and a different and dynamic real-time nuclear information ecosystem, all of which alter nations’ strategic planning and perceptions of (in)security.

The term “Third Nuclear Age” has remained largely restricted to academic circles, despite recent public mentions by British and American security officials (Kirka 2024, Narang 2024). Across 30 interviews conducted by ISYP with government officials and experts from the academic and non-profit sectors, only five respondents mentioned using the term or having heard of it. Many surveyed were uncertain about the sequence of the “nuclear

ages,” but there was widespread agreement about what defined such an era today, including heightened global (in)security and a greater risk of escalation.

The results show that the public's and experts' understanding of the term is limited, and its boundaries are imperfect. The term is relevant and valuable precisely because it frames a multitude of complex issues and challenges, marking a clear progression of existential risk that demands new approaches and new solutions. The diplomatic structures and doctrines that once upheld stability are struggling to adapt to new geopolitical and technological realities, as well as to non-traditional security forces such as climate change, social justice, and public perception. These forces are reshaping the nuclear order, exposing the flaws in traditional thinking and revealing how current security arrangements remain detached from human-centered priorities – a critical dimension that continues to be overlooked.

Yet the urgent need to recalibrate nuclear policies also presents a valuable opportunity to reimagine disarmament – not merely as an idealistic goal, but as a pragmatic pathway to strengthening human security and addressing the interconnected challenges of this new era.

ISYP's second phase of the 3NA project provides a new lens for understanding the academic discourse on the Third Nuclear Age, which has traditionally focused on emerging and disruptive technologies, such as hypersonic weapons and AI. Today, nuclear issues are increasingly converging with broader global challenges, such as climate change, social justice, and public perception. By understanding their dynamics and relationships with nuclear policy, we can pave the way for more adaptive and resilient strategies for the future.

Moreover, the project affords a valuable opportunity to break down long-standing siloes across stakeholders along the nuclear weapons inception to the management chain. It links epistemic communities from disciplines across the sciences, from physicists to policymakers to sociologists. In facilitating these broader conversations, the 3NA 2.0 project aims to generate new ideas and approaches to tackling the challenges of the Third Nuclear Age.

## **Our Approach**

Since 2023, members of ISYP have conducted hybrid formal interviews and discussions with 30 individuals with expertise in the nuclear sector, including those from national governments, non-profit organizations, think tanks, and academic institutions. These discussions were designed to understand how global thought leaders perceived the Third Nuclear Age, their priorities and concerns, and the non-traditional security forces they believed were driving this new era.



## Section 1: Perspectives on Defining the Third Nuclear Age

The global nuclear landscape is undergoing a well-documented transformative shift (NTI, 2025). The defining characteristics of the Third Nuclear Age are reshaping how countries perceive nuclear risks and policies. Based on interviews with experts and officials from various regions, this section examines the key themes emerging in global nuclear discourse. These insights reflect the complexity of contemporary nuclear challenges, which call for innovative, inclusive, and adaptive approaches to ensure global security.

### 1. Erosion of Arms Control

The last decade has been marked by the erosion of the remaining nuclear arms control agreements, including the Intermediate-Range Nuclear Forces (INF) Treaty and the New START Treaty. This reflects a breakdown in the cooperative frameworks that once underpinned nuclear stability during the First and Second Nuclear Ages. Forums for disarmament like the Treaty on the Prohibition of Nuclear Weapons (TPNW) remain insufficient, leaving many nations concerned about the onset of a new arms race. Interviewees highlighted this erosion as a critical challenge, emphasizing the need for innovative diplomatic approaches to reinvigorate these frameworks and build new ones.

### 2. Multipolarity and Instability

The transition from a bipolar to a multipolar global order has intensified instability and distrust among states, raising the risks of nuclear proliferation and conflict. Some interviewees noted that the growing number of nuclear actors and shifting alliances create a precarious environment where miscalculations are becoming increasingly likely. This multipolarity complicates traditional deterrence models, demanding new strategies to manage nuclear risks in an unpredictable geopolitical landscape.

### 3. Technological Disruption

Emerging technologies such as AI, cyber, and hypersonic delivery vehicles are altering the dynamics of nuclear deterrence. Interviewees expressed concern over the blurring of lines between nuclear and conventional weapons, which raises the potential for accidental or inadvertent escalation. The potential integration of AI into command and control systems was identified as particularly destabilizing.

## **4. Diminished Dialogue**

Global nuclear diplomacy is at a standstill, with meaningful dialogue between key powers almost absent. This stagnation, exacerbated by the conflicts in Europe and the Middle East, has further eroded trust between states and pushed back progress on arms control and disarmament. Some interviewees identified the lack of confidence-building measures as a pressing issue, while others underscored the importance of reestablishing channels for multilateral engagement.

## **5. Erosion of the Nuclear Taboo and Growing Proliferation Fears**

The nuclear saber-rattling that has occurred since the invasion of Ukraine in 2022 has endangered long-held norms against the use of nuclear weapons. Threats of nuclear weapons use have brought the prospect of nuclear conflict back into global discourse. This erosion of the nuclear taboo has raised new concerns about horizontal nuclear proliferation, in which new actors may seek to develop or acquire nuclear capabilities to hedge against uncertainty.

## **6. Shifting Deterrence Doctrines**

Technological advancements are fundamentally altering traditional deterrence doctrines. Interviewees noted a trend toward integrating conventional capabilities as potential substitutes for nuclear deterrence. This shift raises questions about the reliability of nuclear deterrence frameworks in maintaining strategic stability altogether.

## **7. Focus on Peaceful Uses**

Some nations, particularly in the Global Majority, remain focused on the peaceful applications of nuclear technology. These interviewees see nuclear energy as vital for achieving energy security and sustainable development goals. However, these aspirations are often constrained by concerns over equitable access and the risks associated with nuclear proliferation.

## **8. Intersection with Global Issues**

Nuclear risks are increasingly seen through the lens of broader global challenges. Some interviewees have underscored the connections between nuclear policy, climate change, and social justice. These links underscore the importance of interdisciplinary approaches in mitigating risks and promoting equitable outcomes.

## **9. Global Majority Frustration**

Non-nuclear-weapon states, particularly in the Global Majority, have expressed frustration over the dominance of nuclear powers in disarmament dialogues. Interviewees criticized the lack of progress toward disarmament and the disproportionate influence of nuclear-armed states in shaping the agenda. This frustration underscores a broader demand for more inclusive and equitable international nuclear governance.

## **10. Diverging Perceptions of Disarmament Amidst a Heightened Nuclear Landscape**

The Russo-Ukrainian conflict and heightened nuclear rhetoric have highlighted a stark divergence in perceptions of disarmament. States aligned with major military alliances increasingly lean on the concept of the nuclear umbrella, viewing it as the primary safeguard against aggression. When such backstops are perceived to be at risk, as has occurred among some NATO allies since the re-election of President Trump, umbrella states have begun to explore alternatives (Lewis, 2025). This perspective has reinforced reliance on nuclear deterrence as a hedge against growing geopolitical uncertainties. In contrast, many nations from the Global Majority view this nuclear landscape as an urgent call to advance disarmament as a means to reduce risks. This dichotomy offers an important insight into how nations perceive security and stability in a volatile geopolitical environment.

## Section 2: Non-traditional Security Challenges in Nuclear Policy

Unlike traditional security considerations, such as great power nuclear competition, weaponry modernization and expansion, and the proliferation of destabilizing nuclear technologies, non-traditional security challenges are often indirect, pervasive, and multifaceted. They include the many economic, technological, environmental, and social dimensions of nuclear weapons (Carnegie, 2019). Understanding these forces is crucial because they directly impact nuclear policy and strategy, are interconnected with broader global trends, and remain insufficiently addressed in traditional nuclear discourse. By considering them, policymakers can better anticipate and respond to complex, interrelated challenges that transcend conventional security paradigms.

### Environmental Challenges

Climate change and natural disasters are two significant environmental challenges that impact nuclear policy. Rising sea levels, extreme weather events, and resource scarcity undermine the stability and safety of nuclear infrastructure, necessitating climate adaptation measures (IPCC, 2014). Disruptions, such as droughts and heatwaves, threaten cooling systems and water supplies for nuclear power plants, while wildfires near nuclear sites heighten the risks of radiological release (Brown & Garver, 2009). Similarly, natural disasters such as earthquakes and tsunamis can severely damage nuclear facilities, underscoring the need for robust safety protocols and emergency preparedness.

Environmental degradation from industrial activities, such as deforestation and pollution, further compounds risk by undermining the physical and operational resilience of nuclear facilities. Deforestation can expose sites to erosion or flooding, while pollution may contaminate critical water sources. These factors can compromise infrastructure integrity and disrupt essential systems, increasing the likelihood of operational failures. Moreover, degraded environments may reduce the effectiveness of security measures, creating gaps that make facilities more susceptible to unauthorized access or sabotage, thereby heightening the overall risk profile.

Relatedly, the consequences of even a limited nuclear exchange, such as a "nuclear winter," could exacerbate global climatic disruptions, triggering widespread famine and instability (Ruff, 2019). Important work continues to be undertaken to fully explore the effects of a nuclear winter, including in the event of a limited nuclear war – notably through a new United Nations–mandated study on the physical and societal consequences of nuclear war, from local to planetary scales (Diaz Maurin, 2024).

## **Economic and Technological Challenges**

Economic factors, such as instability and inequality, influence nuclear strategies by shaping defense budgets, international collaborations, and domestic support for nuclear programs. Economic insecurity often drives reliance on nuclear deterrence as a stabilizing factor (Duffield, 2010). Additionally, economic globalization impacts nuclear policy through sanctions and trade restrictions, influencing access to critical technologies.

Technological advancements, such as AI, cyber capabilities, and advanced delivery systems, are reshaping strategic doctrines and introducing complex new risks to nuclear policy. Historically, innovations like intercontinental ballistic missiles (ICBMs) and anti-ballistic missile systems defined the arms race during the Cold War, driving both competition and arms control efforts. Today, the stakes are further heightened by the integration of emerging technologies, which not only challenge traditional deterrence frameworks but also expose critical nuclear infrastructure to new vulnerabilities, like cyberattacks. These risks underscore the urgent need for robust cybersecurity measures and adaptive policies to safeguard against both traditional and evolving threats.

## **Societal and Perceptual Challenges**

Social justice concerns highlight the disproportionate impact of nuclear activities on marginalized communities, particularly those near uranium mines or nuclear testing sites. These communities often face health risks, environmental degradation, and economic inequities, driving calls for environmental justice and equitable resource distribution (Borrie & Caughley, 2013).

Public perception and media narratives play a pivotal role in shaping nuclear policy. Anti-nuclear movements have historically mobilized public opinion against nuclear weapons, leading to significant policy changes like the 2017 TPNW or the 1991 closure of the Semipalatinsk Nuclear Test Site in Kazakhstan. Conversely, strong public support for nuclear deterrence persists in nuclear-armed states, reflecting the complex interplay of societal attitudes and geopolitical priorities (Tannenwald, 2007; Wittner, 2009).

## **Integration of Non-Traditional Security Challenges in Decision-Making: General Insights from Interviews**

Non-traditional security challenges are integrated into nuclear policy decision-making processes to varying degrees, with distinct approaches observed among states and stakeholders. Some respondents noted that challenges such as climate change, public perception, and social justice are not prioritized in states where maintaining internal stability and control takes precedence. In contrast, other regions and groups consider these factors more explicitly in strategic planning, emphasizing international cooperation and access to technology and education. Several interviewees highlighted the importance of addressing these challenges as they intersect with broader nuclear policy, even if they are not always central to national discussions.

Respondents also underscored the role of social justice in highlighting disparities between nuclear-armed and non-nuclear-armed states, particularly regarding the socioeconomic consequences of the arms race. Despite growing recognition of these challenges, limited resources and institutional support often constrain their integration into policy frameworks. Non-governmental actors play a crucial role in addressing these issues, but they frequently rely on government funding, which tends to prioritize traditional security concerns over emerging and non-traditional challenges.

Climate change, as noted by interviewees, is increasingly acknowledged for its potential impact on the safety and security of nuclear stockpiles, particularly in relation to natural disasters and environmental degradation. Social justice perspectives, such as those advanced through initiatives like the TPNW framework, are gaining momentum, with growing calls for more inclusive and equitable nuclear policymaking. Additionally, respondents emphasized the need to re-examine traditional deterrence policies from a psychological perspective, focusing on public perceptions and the role of narrative in shaping security decisions. However, securing consistent funding for long-term and interdisciplinary efforts remains a significant challenge in comprehensively addressing these non-traditional challenges.

### **Our Focus in This Study**

This study focuses on three key examples of non-traditional security challenges—climate change, social justice, and perception and narrative building—to demonstrate their influence on nuclear policy and their current integration into nuclear policy thinking. By examining these specific areas, the study investigates whether these challenges are taken into account in policymaking.

In many cases, findings reveal that these areas are often overlooked, under-addressed, or only recently beginning to receive attention. Understanding and addressing these non-traditional challenges is crucial for crafting effective and responsible nuclear policies in the Third Nuclear Age and beyond, enabling policymakers to better navigate the evolving complexities of global security.

## **Section 3: Climate Change and Nuclear Policy**

Climate change and nuclear weapons are both existential threats, although the former reveals itself more visibly and immediately than the latter. A handful of our interview partners expressed hope that nuclear disarmament activists could draw valuable lessons from the climate movement and improve their advocacy accordingly. Some also mentioned that this would help to explore the intersection between climate change and nuclear weapons policies.

The diffuse and complex nature of climate change effects means that it poses another non-traditional security challenge within the Third Nuclear Age. Here, we focus on three aspects that are prevalent in the existing literature and were also mentioned during our policy consultations.

### **Nuclear Energy**

First, climate change, particularly efforts to reduce carbon emissions, has brought fresh attention to the potential of nuclear technologies for energy and electricity generation. This, in turn, has raised concerns about the risks of circumventing safeguards and nuclear proliferation. Some researchers and state representatives interviewed downplayed the risks of proliferation from new reactor technologies, while others emphasized states' responsibilities to ensure the highest nuclear safety, security, and safeguards standards when promoting and fielding advanced nuclear technologies. The existing literature is inconclusive given the wide diversity of reactor technologies and the range of factors that shape threats to nuclear safety, security, and safeguards. This pertains to small modular reactors (Zohuri & McDaniel, 2019; Pistner et al., 2021; Tokuhiko, Zeliang, & Mi, 2021; Trakimavičius, 2021) differently than to other fourth-generation reactor concepts (Tuček et al., 2013; BASE, 2024).

Newer concerns relate to the geostrategic importance of nuclear energy facilities and their potential role in contingencies. The September 11th, 2001, attacks and others sparked political awareness and limited research on nuclear terrorism, which was renewed following the invasion of Ukraine and subsequent occupation of the Zaporizhia Nuclear Power Plant (Chapman, 2021; Kurando, 2023; Teremetskyi, 2024). These challenges were notably mentioned often by researchers and representatives of international organizations during policy consultations.

Another concern pertains to states' interests in nuclear technologies for the propulsion of military and non-military vehicles. This includes nuclear propulsion of submarines or spacecraft, which technically fall under safeguards requirements but raise challenges for legal regimes, particularly if they involve fissile materials with dual-use potential, as with AUKUS. Notably, this issue was absent from our policy consultations; however, this may be attributed to the selection of interviewees and the breadth of other topics discussed.

### **Physical impacts of climate change**

Second, research highlights that climate change affects a country's nuclear weapons and nuclear energy programs. Weather extremes, such as floods, heatwaves, and tornadoes, have the potential to significantly impact military facilities that house nuclear weapon systems, relevant assets, and infrastructure for nuclear forces or their command and control systems (Kwong, 2023; Kwong et al., 2024). This dynamic also applies to facilities related to nuclear energy programs, as seen during the Kakhovka Dam collapse, which threatened the Zaporizhia Nuclear Power Plant. Notably, only one researcher and no state representative mentioned this second dimension.

### **Climate impacts of the nuclear enterprise**

Third, nuclear weapons programs and nuclear energy programs can also impact the environment and thereby contribute to climate change dynamics. Several state representatives and researchers noted that activities such as uranium mining and repositories for radioactive nuclear waste can have huge consequences for the environment. Research has shown that such environmental changes have first and second-order effects that also relate to climate change effects (Carvalho, 2007; Corkhill & Hyatt, 2018; Srivastava, Pathak & Perween, 2019; Fernández-Arias, Vergara & Antón-Sancho, 2023).

## Other effects

Only a few state representatives mentioned the nuclear winter theory, which seeks to map the untold short- and long-term climatic impacts of nuclear weapons use. Important research continues to be done on the topic, though there is room for further work exploring more feasible scenarios of limited nuclear use, which have gained prominence in recent years amidst conflicts in Europe, the Middle East, and South Asia.

Climate change also intensifies resource scarcity and migration, increasing the likelihood of violent conflict within nations. Research estimates that climate change has contributed to between 3% and 20% of armed conflicts over the past century, with this impact expected to intensify as conditions worsen (Mach et al., 2019). Acting as a "threat multiplier," climate change exacerbates tensions over resources, displacement, and instability, particularly in vulnerable regions (Putz, 2024). These tensions can escalate into conventional conflicts, fueling nuclear rhetoric and increasing risks, especially when nuclear-armed states are involved. Despite its significance, respondents in interviews rarely highlighted these connections, perhaps assuming the link is obvious or due to a lack of awareness of these connections. This underscores the need for greater focus on, and raising awareness of, the cascading impacts of climate change on nuclear policy and global security.

## Section 4: Social Justice and Nuclear Policy

Social justice intersects with nuclear policy in various ways, particularly through its implications for vulnerable populations affected by nuclear activities. Studies by Kyne and Bolin (2016), Hoffman (2001), and Vilhunen et al. (2022) have highlighted the disproportionate environmental and health impacts borne by communities near nuclear waste sites, where contamination leads to severe consequences. Similar research by Hecht (2012), Malin (2015), and Segal (2012) has examined how uranium mining disproportionately harms indigenous populations, exposing them to radiation, water contamination, and long-term health risks. Nuclear testing in regions such as the Pacific, Algeria, and Kazakhstan has been extensively studied (Bolton, 2022; Alexis-Martin, 2019; Kassenova, 2022), revealing its profound human, environmental, psychological, and societal impacts. Furthermore, historical nuclear events, such as the atomic bombings of Hiroshima and Nagasaki, have also underscored the social justice dimensions of nuclear policy. Scholars such as Selden, Hein, and Braw (1997) and Scarry (2020) have documented the intergenerational health impacts experienced by survivors and their descendants, highlighting the racial and gender dimensions of these injustices.

Respondents in this study's interviews provided diverse insights into how social justice is- or could be-integrated into nuclear policy.

Some respondents emphasized the importance of addressing the intergenerational damage caused by nuclear activities, including environmental degradation and radiation impacts. However, many also acknowledged the difficulty of prioritizing nuclear concerns when immediate human needs, like food security, take precedence. In resource-dependent economies, uranium mining was often discussed in practical terms, with limited attention paid to its broader social justice implications. This tension between immediate economic priorities and long-term environmental and social costs reflects a common challenge in balancing development needs with broader concerns for equity. Efforts in this area often include public engagement initiatives aimed at increasing awareness and participation in nuclear-related decisions, signaling a commitment to transparency in policymaking.

A humanitarian focus in nuclear policy was also evident in the responses. Several noted that historical efforts, such as humanitarian conferences, have shifted the discourse from nuclear possession to the broader consequences of nuclear weapons. This shift emphasizes accountability and stakeholder involvement, with many respondents advocating for a stronger focus on the effects of nuclear weapons use, particularly on vulnerable communities. Survivor-centered advocacy was repeatedly mentioned as a powerful tool for shaping nuclear policy, with survivor testimonies increasingly featured in international forums and policy decisions. These efforts underscore the significance of intergenerational justice and the moral obligation to acknowledge and address historical legacies.

Many respondents emphasized the need for victim assistance, including technical, medical, and scientific support for communities affected by nuclear testing and other nuclear industrial complex-associated activities. These initiatives were framed as essential to addressing the long-term consequences faced by marginalized populations. Several highlighted the role of remediation efforts in fostering trust and demonstrating policymakers' commitment to support affected communities, thereby reinforcing the humanitarian dimensions of nuclear disarmament.

Environmental remediation was another key area of focus. Several respondents stressed the need to address the environmental degradation caused by nuclear testing and uranium mining, with particular emphasis on restoring ecosystems and compensating affected communities. These efforts often intersect with broader environmental and peacebuilding objectives, underscoring the interconnection between nuclear policy and global sustainability.

The theme of gender and inclusion also emerged strongly in the interviews. Respondents highlighted initiatives promoting gender equity in nuclear policymaking, including efforts to increase women's participation in STEM fields and disarmament discussions. Collaborative efforts between governments and organizations to enhance gender representation and address historical wrongdoings were seen as crucial steps in building a more inclusive approach to nuclear policy. However, respondents noted that these efforts remain uneven and require sustained focus and resources. Other similar initiatives integrate social justice themes into nuclear policy by incorporating cultural and regional perspectives, linking these efforts to broader environmental and peacebuilding objectives.

Despite these advances, many respondents highlighted the persistent challenge of resource allocation. Substantial resources allocated to nuclear programs were seen as diverting funds from critical social needs, such as healthcare, education, and poverty alleviation. This misalignment underscores the ongoing tension between national security priorities and broader social justice goals.

Finally, inequitable global risks were a recurring theme in the responses. Non-nuclear-weapon states were described as disproportionately bearing the risks of nuclear conflict or fallout, despite their lack of involvement in nuclear armament. Respondents pointed to the need for equitable frameworks that address this imbalance and prioritize the voices of those most affected by nuclear risks.

Other respondents approached the overlap between social justice and nuclear policy with caution, often avoiding terms or concepts tied to specific historical or diplomatic sensitivities. While some states demonstrate a nominal focus on human-centered policymaking, social justice concerns are frequently relegated to broader human rights initiatives or specialized organizations rather than being fully integrated into nuclear policy frameworks. In contrast, some interviewees mentioned that some states participate in international social justice initiatives primarily to maintain a positive image rather than through substantive involvement. This superficial engagement underscores the broader challenge of ensuring that intentions to address social justice concerns translate into meaningful actions within nuclear policy frameworks.

While many respondents recognized the progress made in integrating social justice into nuclear policy, they also noted significant gaps. These include limited political will, insufficient awareness of the connections between nuclear activities and social justice, and uneven access to resources. However, the themes raised by respondents—ranging from victim assistance and environmental remediation to gender inclusion—underscore the critical need for sustained policy inclusion and interdisciplinary approaches.

By embedding these principles into nuclear policymaking, stakeholders can foster a more equitable and sustainable global nuclear order rooted in fairness, accountability, and more broadly human security.

## **Section 5: Public Perception and Nuclear Policy**

A nuanced understanding of the current nuclear age requires analysis of public perceptions of nuclear weapons. While governments and institutions influence public attitudes through communication strategies and policies (OECD, 2021), public opinion, in turn, can pressure and shape decision-making processes (Smetana et. al., 2025). Perceptions of nuclear weapons are influenced by various factors, including country and regional contexts, cultural aspects, government communication strategies, and non-governmental advocacy, among others (Messmer et al., 2023; Adamsky, 2022; Briggs, 1979). Research has considered how language and metaphors influence public opinion (Thibodeau & Boroditsky, 2015), including how a metaphor of the “Bomb as God” hinders support for nuclear disarmament (Hymans, 2023). Regarding the effect of public opinion on policymaking: In a 2025 study, Smetana et. al. surveyed U.K. and U.S. officials, finding that “high public support notably increases willingness to endorse nuclear first use against non-nuclear adversaries,” while “the effect of public opinion is weaker in nuclear retaliation contexts.”

During our interviews, we posed several questions regarding public opinion, focusing on the perceived relevance to each government and organization that we consulted. Below are key takeaways from this portion of the consultations.

Public engagement with nuclear policy varies significantly across regions and contexts, as highlighted by interview respondents. Public narratives about nuclear weapons, as described by respondents, often revolve around two competing perspectives: one emphasizing their role in maintaining security through deterrence, and the other questioning their efficacy in ensuring peace in a world of persistent conflicts and leaning toward disarmament. Disarmament garners significant public support in contexts where nuclear weapons are viewed as immoral or strategically unnecessary, reflecting a strong historical normative stance against their possession and proliferation. Others emphasized regions where the public views nuclear weapons as essential to national security and a symbol of national pride.

Respondents also identified nuclear testing as one of the most prominent issues influencing public interest. Some respondents emphasized that public attitudes toward

nuclear testing often center on its humanitarian and environmental consequences, although awareness of its broader geopolitical implications remains limited in certain areas.

Respondents also discussed the evolving nature of public perceptions over recent decades, which have been shaped by generational changes and shifting geopolitical realities. They observed that older generations, shaped by the Cold War, often associate nuclear weapons with existential fear, whereas younger generations prioritize contemporary issues like climate change and social justice, perceiving nuclear risks as less immediate. This generational shift presents challenges for policy and advocacy, as maintaining public engagement on nuclear issues requires aligning these topics with current concerns.

Some respondents highlighted discussions about past decisions, such as regret over forgoing nuclear capabilities, which reveal tensions between disarmament aspirations and perceptions of international standing. These reflections highlight the need for targeted public engagement strategies that address both historical legacies and contemporary geopolitical priorities.

Cultural, educational, and media influences were frequently mentioned as key factors shaping public awareness. Respondents pointed out that cultural representations, such as films and memorial events, play a significant role in shaping public understanding and emotional responses. Memorials commemorating victims of nuclear weapons use and testing were cited as particularly effective in raising awareness and fostering dialogue.

Educational efforts led by governments and non-governmental organizations were also identified as critical tools for clarifying misconceptions about nuclear policy and its implications. However, respondents noted that these initiatives vary widely in effectiveness, often reflecting regional capacities and priorities. Efforts to demystify nuclear technology, including its military and civilian applications, were described as essential to overcoming public skepticism. For instance, public concerns about nuclear energy frequently stem from misconceptions about safety and waste management, which some respondents suggested could be addressed through clear and accessible communication.

According to respondents, successful public engagement strategies often involve highlighting tangible benefits, such as job creation and environmental sustainability, while addressing fears through transparency and reassurance. Respondents emphasized that tailoring communication to diverse audiences and cultural contexts is crucial for building trust and understanding. Storytelling and the sharing of lived experiences were frequently

mentioned as powerful tools for integrating public perspectives into policy discussions. By amplifying the voices of affected communities, these approaches were seen as enriching the broader discourse and ensuring that nuclear policies reflect diverse societal values.

Respondents offered mixed views on the extent to which public opinion influences nuclear policy. In some cases, strong public support for disarmament was described as instrumental in shaping diplomatic efforts and agreements. In other instances, public engagement was characterized as limited, hindered by bureaucratic challenges, competing national priorities, domestic political situations, or a lack of interest. Several respondents highlighted the importance of involving communities early in decision-making processes, particularly in policies with local impacts, such as the siting of nuclear facilities.

Respondents identified several barriers to effective public engagement, including bureaucratic inertia, limited public interest, and the perception that nuclear policy is a niche issue overshadowed by more pressing concerns. Overcoming these barriers, they argued, requires sustained efforts to make nuclear policy accessible and relevant to broader audiences. Emphasizing the connections between nuclear issues, human security, environmental justice, and global stability was suggested as a way to bridge these gaps. The insights from respondents underscore the critical role of public perception in shaping nuclear policy. While progress has been made in engaging the public on nuclear issues, significant challenges remain in addressing knowledge gaps, overcoming skepticism, and integrating diverse perspectives into policymaking. By fostering inclusive, transparent, and culturally sensitive dialogue, governments and organizations can bridge the gap between public opinion and nuclear policy, ensuring that societal values are reflected in the pursuit of global security.

## **Section 6: Other Non-Traditional Security Challenges**

Our discussions revealed several key systemic forces shaping the nuclear policy landscape. Among these, emerging technologies—most notably, AI—stood out. Many respondents identified AI as an accelerator of existing risks, underscoring its potential to exacerbate vulnerabilities and complicate risk management. Several participants introduced AI early in their conversations, often without being prompted, reflecting its growing salience in stakeholders' considerations. Concerns centered on the integration of AI into nuclear command, control, and communication systems, particularly when combined with cybersecurity vulnerabilities. These issues were frequently described as urgent, requiring immediate attention and strategic adaptation to navigate the complexities AI introduces to nuclear governance.

Beyond technological advancements, respondents highlighted shifting paradigms in strategic stability and arms control. Traditional frameworks were widely perceived as inadequate to address contemporary challenges, with several interviewees pointing to the erosion of trust and the diminishing relevance of existing arms control agreements. These concerns underscore a pressing need to reassess stability structures and develop new cooperative mechanisms that can effectively manage the evolving security environment.

Another area of significant discussion was terrorism and extremism. Respondents noted that prioritizing national sovereignty over international cooperation has hindered effective responses to global security challenges. Some government officials expressed concerns about increasing political polarization, which they described as shaping domestic debates and influencing the trajectory of nuclear policy. A lack of meaningful dialogue among states was frequently cited as exacerbating trust deficits and undermining efforts to address shared risks.

Energy security remains a top concern, with many viewing nuclear energy as a potential solution to reduce reliance on fossil fuels and achieve sustainability goals. However, limited financial resources and infrastructure pose barriers to the development and deployment of nuclear power, including Small Modular Reactors (SMRs). In this regard, SMR technology also emerged as a topic of interest, particularly in discussions involving entities with a presence on the African continent. Respondents noted the potential of SMRs to contribute to sustainable energy solutions while acknowledging the unique challenges associated with deploying such technologies in diverse and resource-constrained contexts. The focus on self-reliance by various states, intensified by the disruptions of the COVID-19 pandemic, highlights the need for practical, long-term solutions to balance energy needs with economic realities.

Each stakeholder highlighted distinct challenges tied to their specific roles and priorities. Organizations often emphasize financial constraints, noting that their initiatives frequently rely on limited government funding. Others raised concerns about biological weapons, dependence on technology exports, and the critical need for a skilled workforce to maintain nuclear energy facilities. Our conversations highlighted an array of challenges that call for policymaking that takes into account issues across areas of concern.

## Section 7: Policy Implications and Recommendations

The incorporation of non-traditional security challenges into the nuclear policy calculus presents both challenges and opportunities. Climate change, social justice, and public perceptions have historically influenced nuclear policy. Their growing complexity demands a more interdisciplinary, inclusive, and globally aware approach. To navigate the evolving nuclear landscape effectively, policymakers should adopt strategies that address these forces holistically.

### Recognizing Non-Traditional Security Concerns

Non-traditional security concerns, such as climate change, public perception, and social justice, remain insufficiently recognized in nuclear policy circles, despite their growing relevance. To address this gap, governments and organizations could work toward integrating these issues more comprehensively:

- **Climate resilience** could become a more prominent focus in nuclear infrastructure and planning. These adaptations would help ensure the reliability of nuclear systems amid escalating climate risks. Efforts to reinforce facilities and update operational procedures to withstand extreme environmental conditions are critical to the success of nuclear safeguards.
- **Social justice** considerations, such as victim assistance, environmental remediation, and equitable access to nuclear technologies, are foundational to addressing the catastrophic humanitarian and ecological impacts of nuclear weapons. Amplifying the voices of marginalized communities and incorporating their experiences into decision-making processes could make nuclear policy more inclusive and just.
- **Public perceptions** of nuclear policy require renewed attention through transparent and inclusive dialogue. The field has long remained confined to expert circles, creating an elitist and self-contained environment that limits broader understanding and participation. Public engagement should not focus on instilling fear of nuclear conflict, but on education—clarifying how nuclear policy operates and why it matters. The disarmament discourse, often dismissed as unrealistic, suffers from this isolation. Broader societal awareness and the inclusion of new voices are essential to revitalizing progress. Similarly, proactive outreach and educational initiatives on the peaceful uses of nuclear technologies can counter misinformation and build sustained public trust.

## Promoting Interdisciplinary Collaboration

Non-traditional security challenges are inarguably complex. Addressing these issues necessitates interdisciplinary approaches that bridge expertise across fields such as environmental science, public policy, and human rights. Stakeholders should consider the following:

- **Establish platforms for cross-sector collaboration**, such as international hackathons, workshops, and multi-stakeholder dialogues, to generate innovative solutions that drive progress. These formats should engage diverse stakeholders from governments, NGOs, academia, industry, and multiple disciplines. By fostering inclusive environments, these initiatives can harness a wide range of expertise and perspectives, including of young professionals, to develop actionable, creative strategies that address complex challenges collaboratively and effectively.
- **Leverage partnerships between civil society and academia** to research and develop frameworks that incorporate these systemic forces. Dedicated funding streams for interdisciplinary research would accelerate such partnerships.

## Global and Inclusive Engagement

To address these challenges effectively, nuclear policy must move beyond its traditional focus on major powers and adopt a broader, more inclusive perspective. Priorities include:

- **Deepening engagement with the Global Majority:** recognizing its strategic importance and unique perspectives on disarmament and non-proliferation. This involves fostering equitable partnerships and addressing regional priorities, such as energy security and sustainable development.
- **Providing adequate funding for initiatives addressing non-traditional challenges**, ensuring that financial constraints do not impede progress. This includes support for victim assistance programs, educational campaigns, and interdisciplinary research.
- **Enhancing multilateral cooperation** by strengthening existing treaties and frameworks to reflect contemporary realities.

As the next stage of this project, ISYP will organize a policy hackathon to develop detailed, practical, and actionable solutions based on the broader recommendations outlined above. This initiative aims to ensure that the strategies proposed are both innovative and feasible, making them implementable by relevant stakeholders. By convening a diverse range of perspectives and expertise, the hackathon will focus on translating the insights gained from this study into concrete policy recommendations that effectively address the complexities of non-traditional security challenges in nuclear policy.

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